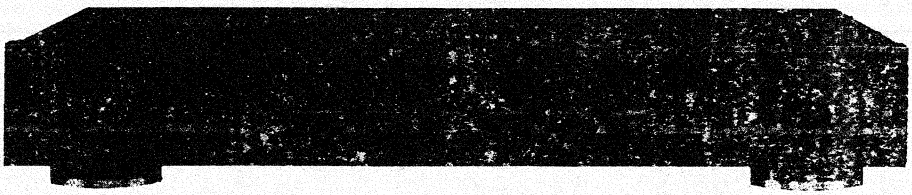
DENON

Hi-Fi Component

SERVICE MANUAL

MODEL DA-500

D/A CONVERTER



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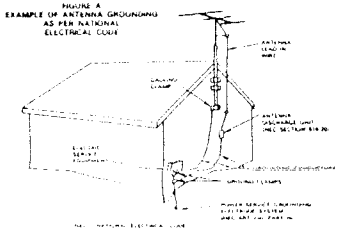
NIPPON COLUMBIA CO., LTD.

SAFETY INSTRUCTIONS

1. Read Instructions – All the safety and operating instructions should be read before the appliance is operated.
2. Retain Instructions – The safety and operating instructions should be retained for future reference.
3. Heed Warnings – All warnings on the appliance and in the operating instructions should be adhered to.
4. Follow Instructions – All operating and use instructions should be followed.
5. Water and Moisture – The appliance should not be used near water – for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, and the like.
6. Carts and Stands – The appliance should be used only with a cart or stand that is recommended by the manufacturer.

6A. An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.

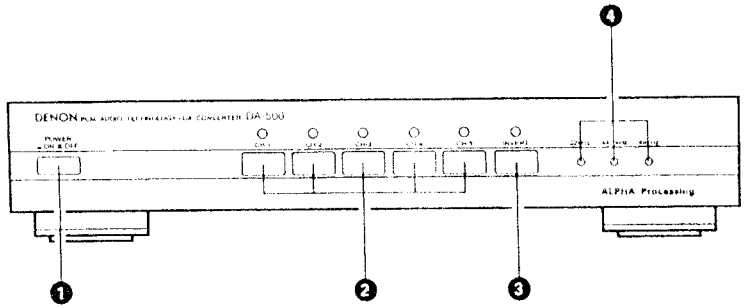
7. Wall or Ceiling Mounting – The appliance should be mounted to a wall or ceiling only as recommended by the manufacturer.
8. Ventilation – The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or, placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.
9. Heat – The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat.
10. Power Sources – The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.
11. Grounding or Polarization – Precautions should be taken so that the grounding or polarization means of an appliance is not defeated.



12. Power-Cord Protection – Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.
14. Cleaning – The appliance should be cleaned only as recommended by the manufacturer.
15. Power Lines – An outdoor antenna should be located away from power lines.
16. Outdoor Antenna Grounding – If an outside antenna is connected to the receiver, be sure the antenna system is grounded so as to provide some protection against voltage surges and built-up static charges. Article 810 of the National Electrical Code, ANSI/NFPA 70, provides information with regard to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna-discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See Figure A.
17. Nonuse Periods – The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.
18. Object and Liquid Entry – Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.
19. Damage Requiring Service – The appliance should be serviced by qualified service personnel when:
    A. The power-supply cord or the plug has been damaged; or
    B. Objects have fallen, or liquid has been spilled into the appliance; or
    C. The appliance has been exposed to rain; or
    D. The appliance does not appear to operate normally or exhibits a marked change in performance; or
    E. The appliance has been dropped, or the enclosure damaged.
20. Servicing – The user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

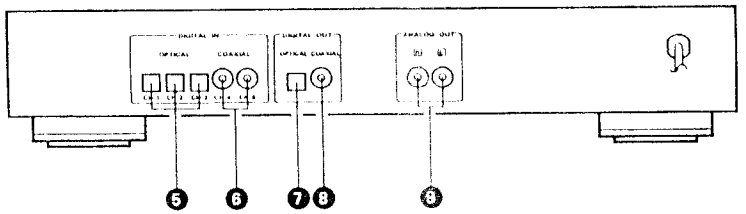
FRONT PANEL
FRONTPLATTE
PANNEAU AVANT
PANNELLO FRONTALE

TABLERO FRONTAL
VOORPANEEL
FRONT PANELEN
PAINEL FRONTAL

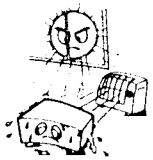


REAR PANEL
RÜCKWAND
PANNEAU ARRIERE
IL PANNELLO POSTERIORE

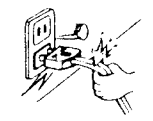
PANEL TRASERO
ACHTERPANEEL
BAKSIDAN
PAINEL TRAZEIRO



NOTE ON USE/HINWEISE ZUM GEBRAUCH/OBSERVATIONS RELATIVES A L'UTILISATION NOTE SULL'USO/NOTAS SOBRE EL USO/ALVORENS TE GEBRUIKEN/OBSERVERA OBSERVAÇÕES QUANTO AO USO

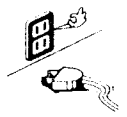


- Avoid high temperatures
  Allow for sufficient heat dispersion when installed on a rack
- Vermeiden Sie hohe Temperaturen
  Beachten Sie, daß eine ausreichend Luftzirkulation gewährleistet wird, wenn das Gerät auf ein Regal gestellt wird.
- Eviter des températures élevées
  Tenir compte d'une dispersion de chaleur suffisante lors de l'installation sur une étagère
- Evitate di esporre l'unità a temperature alte
  Assicuratevi che ci sia un'adeguata dispersione del calore quando installate l'unità in un mobile per componenti audio
- Evite altas temperaturas
  Permite la suficiente dispersión del calor cuando está instalado en la consola
- Vermijd hoge temperaturen
  Zorg voor een degelijk hitteafvoer indien het apparaat op een rek wordt geplaatst
- Undvik höga temperaturer
  Se till att det finns möjlighet till god värmeavledning vid montering i ett rack
- Evite altas temperaturas
  Conceda suficiente dispersão de calor quando o equipamento for instalado numa prateleira

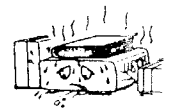


- Handle the power cord carefully
  Hold the plug when unplugging the cord
- Gehen Sie vorsichtig mit dem Netzkabel um
  Halten Sie das Kabel am Stecker, wenn Sie den Stecker herausziehen
- Manipuler le cordon d'alimentation avec précaution.
  Tenir la prise lors du débranchement du cordon
- Maneggiate il filo di alimentazione con cura.
  Agite per la spina quando scollegate il cavo dalla presa
- Maneje el cordón de energía con cuidado
  Sostenga el enchufe cuando desconecte el cordón de energía
- Hanteer het netsnoer voorzichtig
  Houd het snoer bij de stekker vast wanneer deze moet worden aan- of losgekoppeld
- Hantera nätkabeln varsamt
  Håll i kabeln när den kopplas från el uttaget
- Manuseie com cuidado o fio condutor de força
  Segure a tomada ao desconectar o fio

- Keep the set free from moisture, water, and dust
- Halten Sie das Gerät von Feuchtigkeit, Wasser und Staub fern
- Protéger l'appareil contre l'humidité, l'eau et la poussière
- Tenete l'unità lontana dall'umidità, dall'acqua e dalla polvere
- Mantenga el equipo libre de humedad, agua y polvo
- Låt gärn vuchtighet, vatten och damm
- Utsätt inte apparaten för fukt, vatten och damm
- Mantenha o aparelho livre de qualquer umidade, água ou poeira

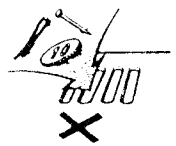


- Unplug the power cord when not using the set for long periods of time
- Wenn das Gerät eine längere Zeit nicht verwendet werden soll, trennen Sie das Netzkabel vom Netzstecker
- Débrancher le cordon d'alimentation lorsque l'appareil n'est pas utilisé pendant de longues périodes
- Disinnestate il filo di alimentazione quando avete l'intenzione di non usare il filo di alimentazione per un lungo periodo di tempo
- Desconecte el cordón de energía cuando no utilice el equipo por mucho tiempo
- Neem altijd het netsnoer uit het stopcontakt wanneer het apparaat gedurende een lange periode niet wordt gebruikt
- Koppla ur nätkabeln om apparaten inte kommer att användas i lång tid
- Desligue o fio condutor de força e aldo o aparelho não fiver que ser usado por um longo período

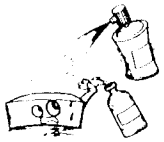


*(For sets with ventilation holes)

- Do not obstruct the ventilation holes
- Die Belüftungsöffnungen dürfen nicht verdeckt werden
- Ne pas obstruer les trous d'aération
- Non coprire i fori di ventilazione
- No obstruya los orificios de ventilación
- De ventilatieopeningen mogen niet worden beblokkeerd
- Não obstrua os orificios de ventilação



- Do not let foreign objects in the set
- Keine fremden Gegenstände in das Gerät kommen lassen
- Ne pas laisser des objets étrangers dans l'appareil
- È importante che nessun oggetto è inserito all'interno dell'unità
- No deje objetos extraños dentro del equipo
- Laat geen vreemde voorwerpen in dit apparaat vallen
- Se till att främmande föremål inte tränger in i apparaten
- Não deixe objetos estranhos no aparelho



- Do not let insecticides, benzene, and thinner come in contact with the set
- Lassen Sie das Gerät nicht mit Insektiziden, Benzin oder Verdünnungsmitteln in Berührung kommen
- Ne pas mettre en contact des insecticides, du benzène et un diluant avec l'appareil
- Assicuratevi che l'unità non venga in contatto con insetticidi, benzolo o solventi
- No permita el contacto de insecticidas, gasolina y disolventes con el equipo
- Laat geen insectenverdelgende middelen, benzine of verfverdunner met dit apparaat in kontakt komen
- Se till att inte insektsmedel på sprayburk, bensen och thinner kommer i kontakt med apparatens hölje
- Não permita que inseticidas, benzina e dissolvente entrem em contacto com o aparelho

- Never disassemble or modify the set in any way
- Versuchen Sie niemals das Gerät auseinander zu nehmen oder auf jegliche Art zu verändern
- Ne jamais démonter ou modifier l'appareil d'une manière ou d'une autre
- Non smontate mai né modificate l'unità in nessun modo
- Nunca desarme o modifique el equipo de ninguna manera
- Nooit dit apparaat demonteren of op andere wijze modificren
- Ta inte isär apparaten och försök inte bygga om den
- Nunca desmonte ou modifique o aparelho de alguma forma

IMPORTANT TO SAFETY

WARNING:

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

CAUTION:

1. **Handle the power supply cord carefully**
   Do not damage or deform the power supply cord. If it is damaged or deformed, it may cause electric shock or malfunction when used. When removing from wall outlet, be sure to remove by holding the plug attachment and not by pulling the cord.
2. **Do not open the top cover**
   In order to prevent electric shock, do not open the top cover. If problems occur, contact your DENON DEALER.
3. **Do not place anything inside**
   Do not place metal objects or spill liquid inside the D/A Converter. Electric shock or malfunction may result.

Please, record and retain the Model name and serial number of your set shown on the rating label.

Model No. DA-500 Serial No. .....

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

CAUTION:
USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

THE D/A CONVERTER SHOULD NOT BE ADJUSTED OR REPAIRED BY ANYONE EXCEPT PROPERLY QUALIFIED SERVICE PERSONNEL.

NOTE:
This unit may cause interference to radio and television reception if you do not operate it in strict accordance with this OPERATING INSTRUCTIONS.

This unit complies with Class B computing device rules in accordance with the specifications in Sub-part J of Part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. If the unit does cause interference to any radio or television reception, try to reduce it by one or more of the following means:
a) Turn the other unit to improve reception.
b) Move this unit.
c) Move this unit away from others.
d) Plug this unit respectively into a different AC outlet.

* This is note in accordance with Section 15.838 of the FCC Rules.

• NUR FÜR EUROPÄISCHE MODELLE

Konformitätserklärung

Die DENON Electronic GmbH
Halskestraße 32
40880 Ratingen

Erklärt als Hersteller/Importeur, daß das in dieser Bedienungsanleitung beschriebene Gerät den Technischen Vorschriften für Ton- und Fernseh-Rundfunkempfänger nach der Amtsblattverfügung 868/1989 (Amtsblatt des Bundesministers für Post und Telekommunikation vom 31. 8. 1989) entspricht.

We greatly appreciate your purchase of this DENON product.
To ensure that you take fullest advantage of your D/A converter, read these instructions carefully before using the unit and be sure to always operate it properly.
After reading these instructions, be sure to keep them for future reference should questions or problems arise.

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Please check to make sure the following items are included with the main unit in the carton.

(1) Operating Instructions 1
(2) Connection Cord 1

FEATURES

The DA-500 is a D/A converter using a newly developed ALPHA (Adaptive Line Pattern Harmonized Algorithm) processor to provide the ultimate waveform reproduction and in particular faithful reproduction of the original sound at low levels.

(1) **Ultimate signal reproduction using a newly developed ALPHA processor**
1. High speed interpolation by the newly developed ALPHA processor recreates the data below the LSB (least significant bit) lost upon recording to provide smooth waveform reproduction.
2. The effects of ALPHA processing are particularly noticeable at low levels, such as when music gently fades out or gradually emerges from total silence.

(2) **High precision D/A converters**
The highly acclaimed 20 bit Super Linear Converter is used to provide unrivaled linearity at low levels.

(3) **High precision digital filter**
The DA-500 uses a high performance 20-bit input digital filter of the type used for professional recording.

IMPORTANT
(CANADIAN MODEL ONLY)

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus setout in the Radio Interference Regulations of the Canadian Department of Communication.

- **Line Voltage Selection (for multiple voltage model only)**
  - The desired voltage may be set with the VOLTAGE SELECTOR knob on the rear panel, using a screwdriver.
  - Do not twist the VOLTAGE SELECTOR knob with excessive force as this may cause damage.
  - If the VOLTAGE SELECTOR knob does not turn smoothly, please contact a qualified serviceman.

VOLTAGE SELECTOR

- **FOR U.S.A. & CANADA MODEL ONLY**

CAUTION

TO PREVENT ELECTRIC SHOCK DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

- **POUR LES MODELES AMERICAINS ET CANADIENS UNIQUEMENT**

ATTENTION

POUR PREVENIR LES CHOCS ELECTRIQUES NE PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS EN LAISSER AUCUNE PARTIE A DECOUVERT.

NAMES AND FUNCTIONS OF PARTS

❶ **Power Switch (POWER)**
- Press this to turn on the power of the DA-500.

❷ **Input Selector Switches (CH-1 to CH-5)**
- Use these switches to select one of the digital signal input jacks on the rear panel (❺ or ❻).
- The corresponding LED (light emitting diode) lights.

❸ **Phase Inverter Switch**
- Press this to invert the phase of the output signals from output jack ❾.
- The LED (light-emitting diode) lights when the inverted output mode is selected.

❹ **Sampling Frequency Indicators**
- Digital audio signals with three different sampling frequencies (32 kHz, 44.1 kHz and 48 kHz) can be connected to the DA-500's digital inputs.
- The LED (light-emitting diode) for the sampling frequency of the digital audio signals connected to the channel selected with the input selector switches lights.

NOTE:
The input selector switch and the phase inverter switch position set when the power is turned off are stored in the memory, so the same input selector switch and phase inverter switch position are automatically set when the power is turned back on.

❺ **Digital Input Jacks – (CH-1 to CH-3) (OPTICAL-TOS)**
- These are digital input jacks for connection of an optical fiber cable.
- These input jacks are selected when one of the channel 1 to 3 (CH-1 to CH-3) input selector switches on the front panel is selected.

❻ **Digital Input Jacks – (CH-4 and CH-5) (COAXIAL-RCA)**
- These are digital input jacks for connecting a 75 Ω/ohm RCA pin plug cord.
- These input jacks are selected when the channel 4 (CH-4) or channel 5 (CH-5) input selector switch on the front panel is selected.

❼ **Digital Output Jack (OPTICAL-TOS)**
- Digital data is output in optical form from this jack.
- The digital data input to the digital input jack selected with the input selector switches on the front panel (CH-1 to CH-5) is output from this jack.
- Optical fiber cables can be connected to this jack.

❽ **Digital Output Jack (COAXIAL-RCA)**
- Digital data is output from this jack.
- The digital data input to the digital input jack selected with the input selector switches on the front panel (CH-1 to CH-5) is output from this jack.
- 75 Ω/ohm RCA pin plug cords can be connected to this jack.

❾ **Analog Output Jacks (UNBALANCE) (Coaxial RCA)**
- Use these jacks for connection to the amplifier's input jacks.

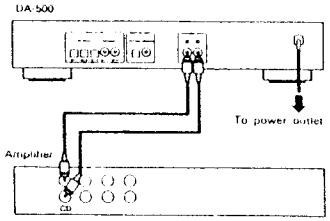
CONNECTIONS

Always turn the power of all components off when making connections.

Output Jack Connections

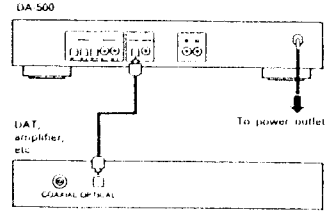
❶ Analog Output Jacks (UNBALANCE)

- Connect as shown on the diagram using the included RCA pin plug cords.
- Use the amplifier's [CD], [AUX] or [TAPE/PLAY] input jacks.
- Use the red lined pin plug cord for the right channel, the white lined pin plug cord for the left channel.



❷ Digital Output Jack (OPTICAL-TOS)

- Connect as shown on the diagram using an optical fiber cable, available in stores.
- The jack includes a cap. Remove the cap, then insert the cord securely so that it is locked.

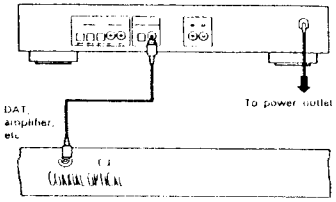


❸ Digital Output Jack (COAXIAL-RCA)

- Connect as shown on the diagram using a coaxial 75 Ω /ohm RCA pin plug cord, available in stores.

NOTE:

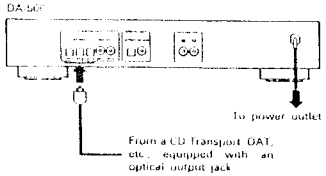
* Do not connect the COAXIAL jack to an audio jack, for example an amplifier's CD input jack.



Input Jack Connections

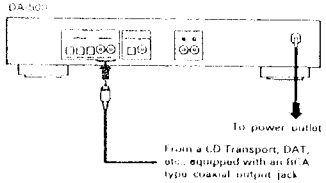
❶ Digital Input Jacks (OPTICAL-TOS) (CH-1 to CH-3)

- Connect as shown on the diagram using an optical fiber cable, available in stores.
- The jack includes a cap. Remove the cap, then insert the cord securely so that it is locked.



❷ Digital Input Jacks (COAXIAL-RCA) (CH-4 and CH-5)

- Connect as shown on the diagram using a coaxial 75 Ω /ohm RCA pin-plug cord, available in stores.



OPERATION PRECAUTIONS

- **Optical fibers**
  The DA-500 uses optical fiber transmission for digital input jacks channels 1 to 3 (CH-1 to CH-3) and one of the digital output jacks. With optical fiber cables, light signals are transmitted along the inner core. Scratches on the tip of the plug or foreign objects in the receptacle could seriously hamper signal transmission.
  If there is extra cable length, coil the cable into a wide loop behind the set. Never strongly bend the cable.
  Optical fiber cables must be connected to the connectors in a specific direction.
  Always hold on the plug when disconnecting the cable. Never pull directly on the cable.
- **Volume level**
  The DA-500 has a wide dynamic range. Be careful not to turn the volume on the amplifier up too high for example at the beginning of a piece when the level seems low, as the speakers may be damaged at sections where the volume level is high.
- **Place of Installation**
  Humming may occur if the DA-500 is installed near a TV or other audio components or if their connection cords are nearby. If this happens, try setting the components or their connection cords in a different position. Also, noise may be heard in AM or FM broadcasts if the DA-500 is turned on while listening to a tuner. If this happens, turn the DA-500's power off.

INSTALLATION PRECAUTIONS

This D/A converter uses a microcomputer for controlling internal electronic circuits. In the event that the converter is used while a nearby tuner or TV is turned on, although unlikely, interference could occur either in the sound from the tuner or the picture of the TV. To avoid this, please take the following precautions.

- Keep the D/A converter as far away from the tuner or TV set as possible.
- Keep the power cable and connecting cable of the D/A converter separate from the antenna wires of the tuner and TV.
- Interference is particularly likely to occur when an indoor antenna or a 300 Ω /ohm feeder cable is used. Thus, use of an outdoor antenna and 75 Ω /ohm coaxial cable is strongly recommended.

300 Ω /ohm feeder cable

75 Ω /ohm coaxial cable

TROUBLESHOOTING

Check the following once again before assuming there is a problem with the DA-500.

- **Are all connections correct ?**
- **Is the DA-500 being operated properly as described in the instructions ?**

If the set is not operating properly, check as shown on the table below. If this does not solve the problem, the DA-500 may be malfunctioning. Turn the power off immediately and contact your store of purchase.

Symptom	Cause	Refer to:
No sound is produced, or sound is distorted.	Output cord is not properly connected to the amplifier. Amplifier controls and switches not properly set.	Page 8

SPECIFICATIONS

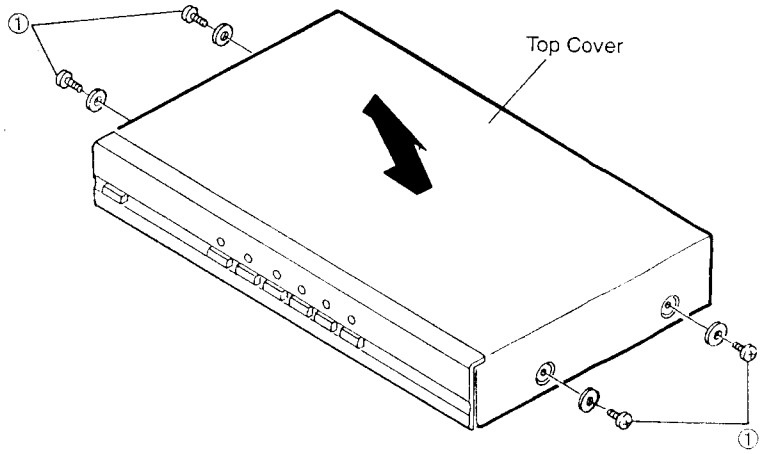
- **Audio**
  - **No. of channels:** 2 channels
  - **Frequency response:** 2 ~ 20,000 Hz
  - **Dynamic range:** 100 dB
  - **Signal-to-noise ration:** 112 dB
  - **Harmonic distortion:** 0.0025%
  - **Separation:** 105 dB (1kHz)
  - **Output voltage:** Unbalanced: 2 Vrms/10 kΩ /kohm load
- **Digital input signal format**
  - **Format:** Digital audio interface
  - **• OPTICAL-TOS**
    - **Acceptable laser power:** -27 dBm or greater
    - **Acceptable laser wavelength:** 660 nm
- **Digital output signal format**
  - **• OPTICAL-TOS**
    - **Peak optical power:** -15 dBm ~ -21 dBm
    - **Acceptable laser wavelength:** 660 nm
  - **• COAXIAL-RCA:** 0.5 Vp-p/75 Ω /ohm
- **General**
  - **Power Supply:** Frequency and voltage are shown on rating label.
  - **Power Consumption:** 10 W
  - **Dimensions:** 434 (W) × 74 (H) × 280 (D) mm (17 3/32" × 2 59/64" × 11")
  - **Weight:** 3.4 kg (7 lbs 12 oz)

* Design and specifications are subject to change without notice in the course of product improvement.

DISASSEMBLY

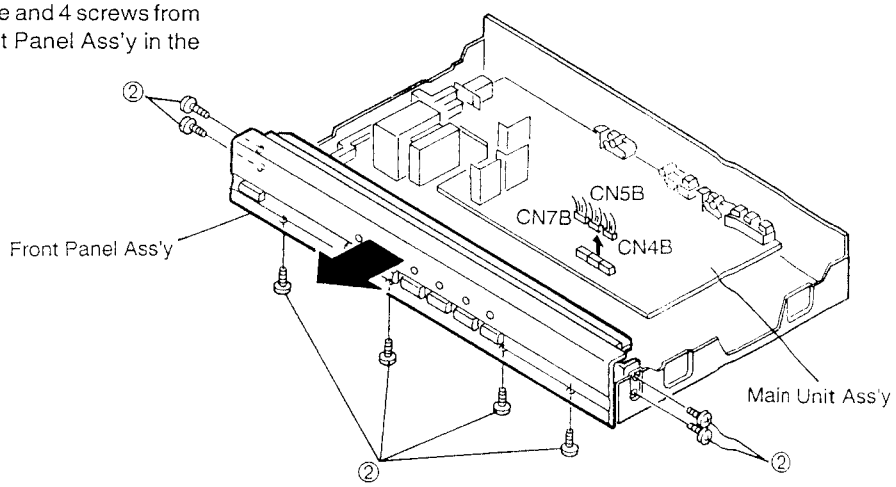
1. Top Cover

①Remove 4 screws fastening the Top Cover on the both sides. then detach the Top Cover in the arrow direction.



2.Front Panel Ass'y

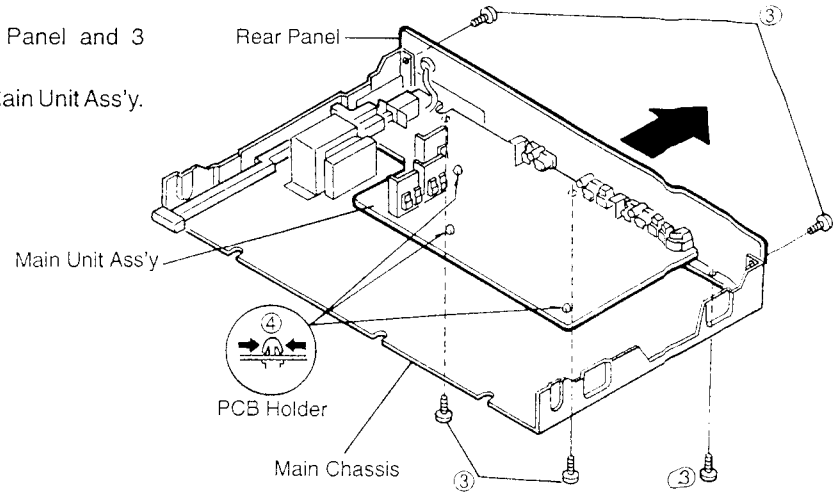
②Discount CN4B, CN5B and CN7B in the Main Unit Ass'y, remove 4 screws from the bottom side and 4 screws from the both sides, then detach the Front Panel Ass'y in the arrow direction.



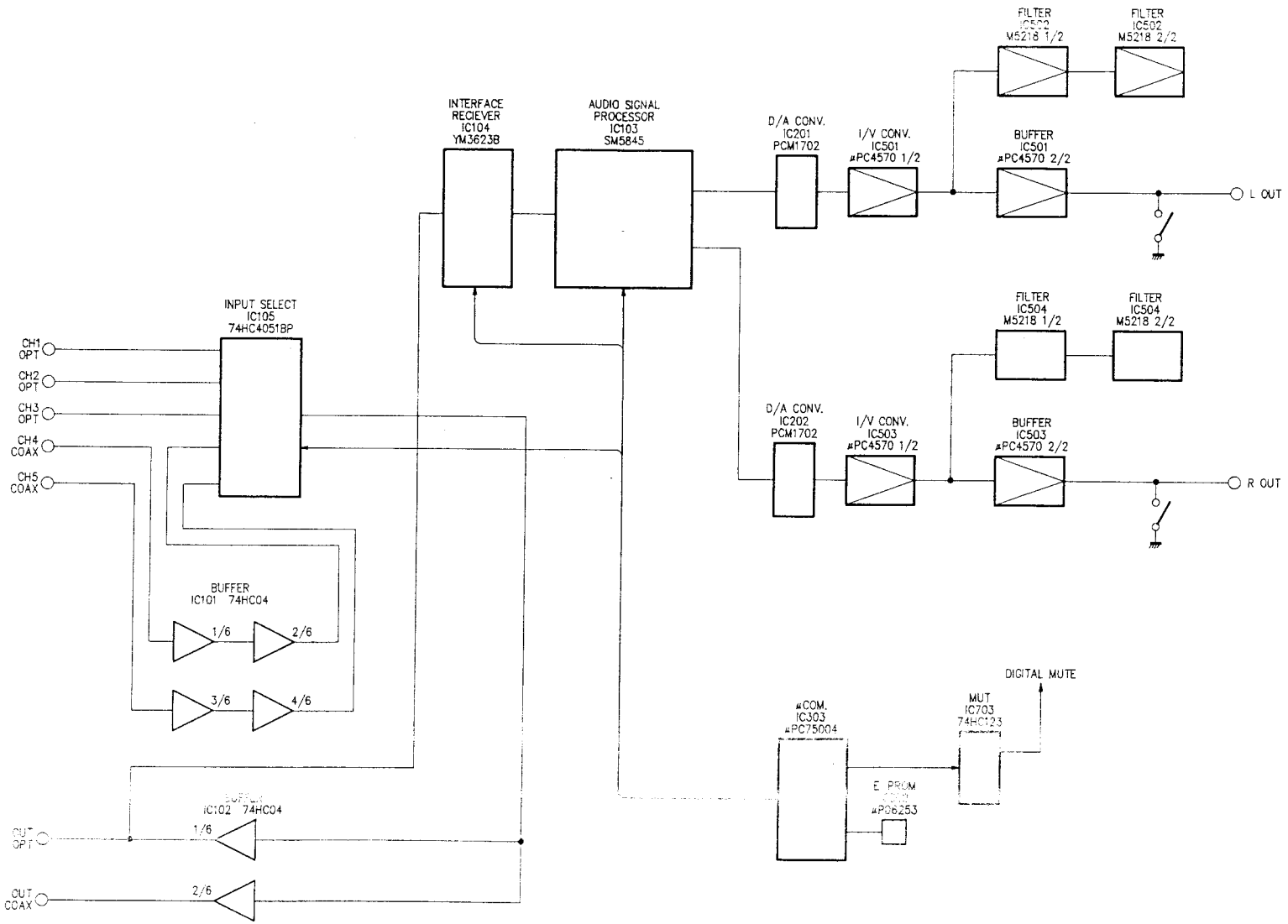
3.Main Unit Ass'y

③Remove 2 screws mounting the Rear Panel and 3 screws fixing Main Chassis.

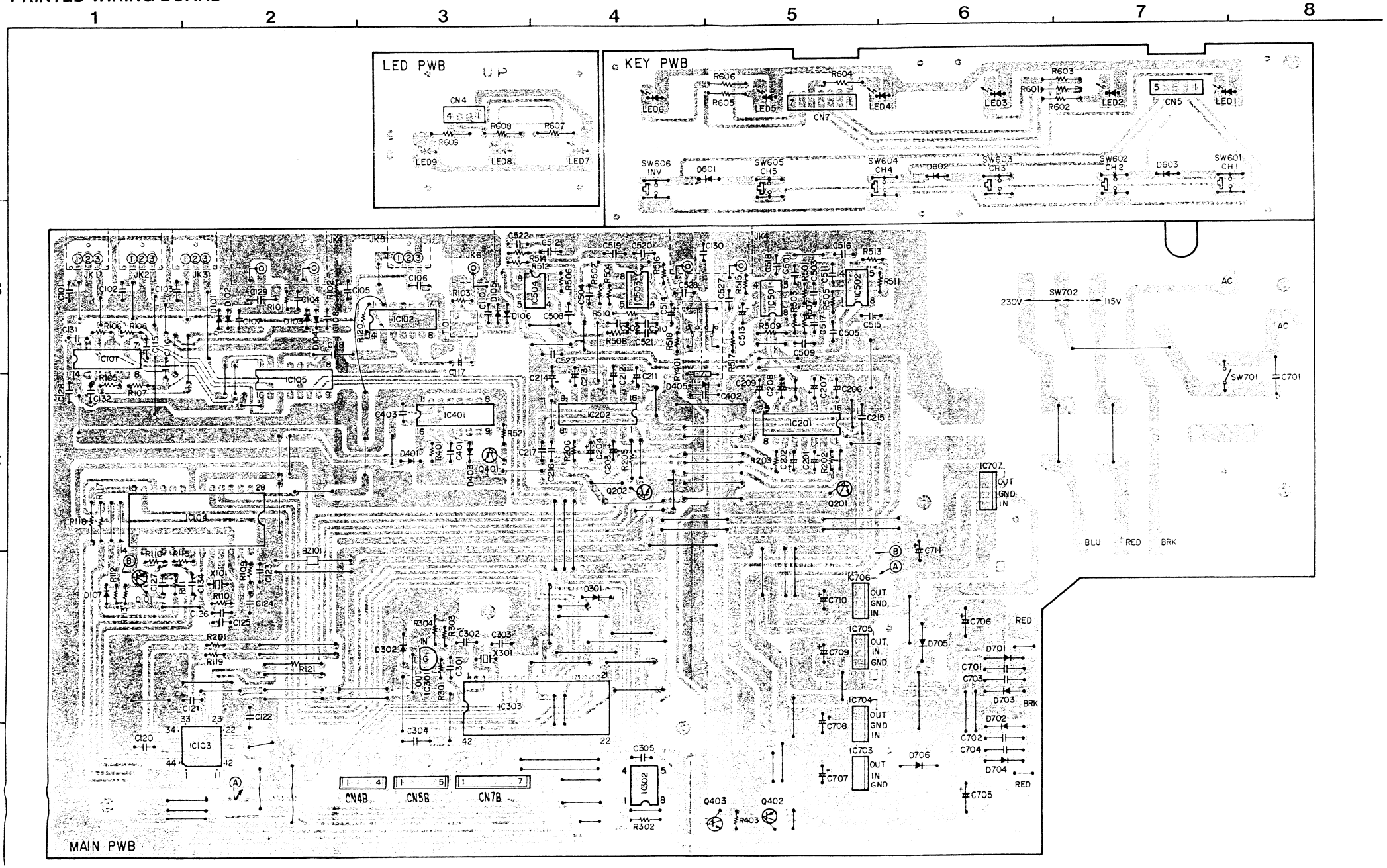
④Release 3 PCB Holders, then detach the Main Unit Ass'y.



BLOCK DIAGRAM



PRINTED WIRING BOARD



NOTE FOR PARTS LIST

- Part indicated with the mark " ◉ " are not always in stock and possibly to take a long period of time for supplying, or in some case supplying of part may be refused.
- When ordering of part, clearly indicate "1" and "l" (i) to avoid mis-supplying.
- Ordering part without stating its part number can not be supplied.
- Part indicated with the mark "★" is not illustrated in the exploded view.
- Not including Carbon Film ±5%, 1/4W Type in the P.W.Board parts list. (Refer to the Schematic Diagram for those parts.)

WARNING:

Parts marked with this symbol ⚠ ▒▒ have critical characteristics.
Use ONLY replacement parts recommended by the manufacturer.

● Resistors

Ex.: RN (Type) 1/4K (Shape and performance) 2E (Power) 182 (Resistance) G (Allowable error) FR (Others)

RD : Carbon	2B : 1/8W	F : ±1%	P : Pulse-resistant type
RC : Composition	2E : 1/4W	G : ±2%	NL : Low noise type
RS : Metal oxide film	2H : 1/2W	J : ±5%	NB : Non-burning type
RW : Winding	3A : 1W	K : ±10%	FR : Fuse-resistor
RN : Metal film	3D : 2W	M : ±20%	F : Lead wire forming
RK : Metal mixture	3F : 3W		
	3H : 5W		

• Resistance

1 8 2 ⇒ 1800 ohm = 1.8 kohm
- 2 — Indicates number of zeros after effective number.
- 18 — 2-digit effective number.

• Units: ohm

1 R 2 ⇒ 1.2 ohm
- 2 — 1-digit effective number.
- 1R — 2-digit effective number, decimal point indicated by R.

• Units: ohm

● Capacitors

Ex.: CE (Type) 04W (Shape and performance) 1H (Dielectric strength) 2R2 (Capacity) M (Allowable error) RP (Others)

CE : Aluminum foil electrolytic	0J : 6.3V	F : ±1%	HS : High stability type
CA : Aluminum solid electrolytic	1A : 10V	G : ±2%	BP : Non-polar type
CS : Tantalum electrolytic	1C : 16V	J : ±5%	NR : Rip. resistant type
CQ : Film	1E : 25V	K : ±10%	DL : For charge and discharge
CK : Ceramic	1V : 35V	M : ±20%	HF : For during high frequency
CC : Ceramic	1H : 50V	Z : +80% −20%	U : UL part
CP : Oil	2A : 100V	P : +100% −0%	C : CSA part
CM : Mica	2B : 125V	C : ±0.25pF	W : UL-VDE type
CF : Metallized	2C : 160V	D : ±0.5pF	F : Lead wire forming
CH : Metallized	2D : 200V	= : Others	
	2E : 250V		
	2H : 500V		
	2J : 630V		

• Capacity (electrolyte only)

2 2 2 ⇒ 2200μF
- 22 — Indicates number of zeros after effective number.
- 2 — 2-digit effective number.

• Units: μF.

2 R 2 ⇒ 2.2μF
- 2 — 1-digit effective number.
- 2R — 2-digit effective number, decimal point indicated by R.

• Units: μF.

• Capacity (except electrolyte)

2 2 2 ⇒ 2200pF = 0.0022μF
- 22 — (More than 2) — Indicates number of zeros after effective number.
- 2 — 2-digit effective number.

• Units: μF.

2 2 1 ⇒ 220pF
- 22 — (0 or 1) — Indicates number of zeros after effective number.
- 1 — 2-digit effective number.

• Units: pF.

• When the dielectric strength is indicated in AC, "A.C." is included after the dieelectric strength value.

PRINTED WIRING BOARD PARTS LIST

MAIN UNIT ASS'Y

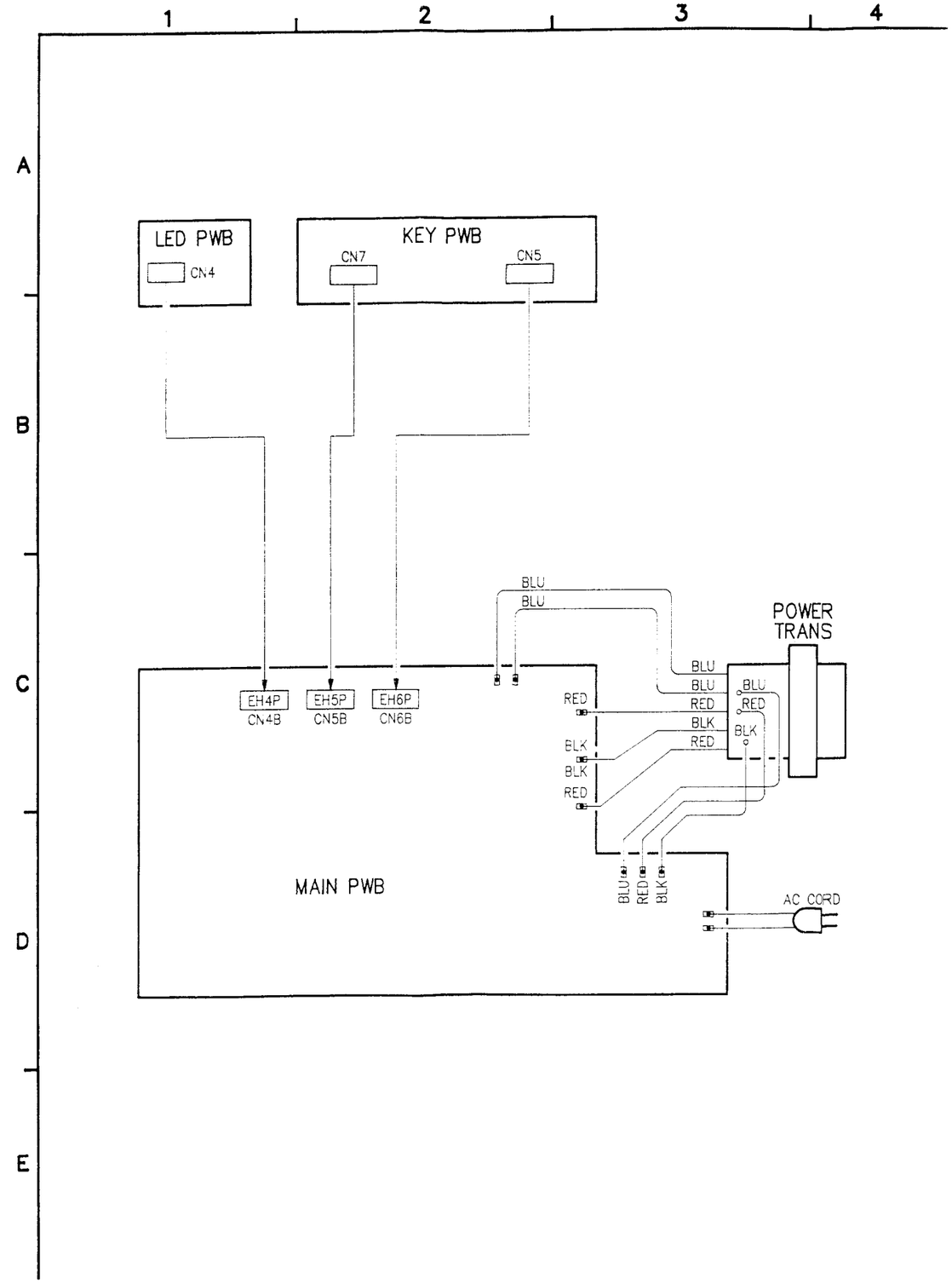
Ref.No.	Part No.	Part Name	Remarks
SEMICONDUCTORS GROUP			
IC101,102	262 1265 002	IC TC74HCU04AP	
IC103	262 1869 000	IC SM5845-AF	
IC104	262 0910 002	IC YM3623B	
IC105	262 1158 009	IC TC74HC4501AP	
IC201,202	262 1837 016	IC PCM-1702P-J	
IC301	263 0803 002	IC PST520D	
IC302	DA5 0003 204	IC μPD6253	
IC303	BA5 0003 202	IC μPD75008	
IC401	262 1089 013	IC TC74HC123AP	
IC501	262 0864 006	IC μPC4570C	
IC502	DA5 0003 203	IC M5218A	
IC503	262 0864 006	IC μPC4570C	
IC504	DA5 0003 203	IC M5218A	
IC701,702	268 0055 004	IC ICP-F15	
IC703	DA5 0003 205	IC TA79012S	
IC704	DA5 0003 206	IC TA7812S	
IC705	DA5 0003 207	IC TA79005S	
IC706,707	HMA R810 201	IC TA7805S	
Q101	269 0025 008	Transistor RN1202	
Q201,202	269 0025 008	Transistor RN1202	
Q401	271 0191 906	Transistor 2SA1048GR	
Q402	269 0026 007	Transistor RN2202	
Q403	269 0029 004	Transistor RN1204	
D101~107	276 0432 000	Diode 1SS270A	
D301,302	DA5 0003 208	Diode SB10-03A3	
D401	276 0432 000	Diode 1SS270A	
D403	276 0432 000	Diode 1SS270A	
D405	276 0432 000	Diode 1SS270A	
D601~603	276 0432 000	Diode 1SS270A	
D701~704	930 0327 002	Diode 1N4003	
D705,706	276 0519 004	Diode 1SR35-200A	
LED1~6	DA5 0003 216	LED SLR342VR3F	
LED7~9	DA5 0003 216	LED SLR342VR3F	
LED1~6	DA5 0003 217	LED Collar LH-5S-6	

Ref.No.	Part No.	Part Name	Remarks
RESISTORS GROUP			
R101~103	241 2395 097	Carbon 75ohm 1/4W	
R105,106	241 2402 951	Carbon 47kohm 1/4W	
R107,108	241 2404 959	Carbon 330kohm 1/4W	
R109	241 2397 008	Carbon 220ohm 1/4W	
R110	241 2405 974	Carbon 1Mohm 1/4W	
R111	241 2397 972	Carbon 470ohm 1/4W	
R112	241 2400 021	Carbon 5.1kohm 1/4W	
R113	241 2397 972	Carbon 470ohm 1/4W	
R115~119	241 2398 955	Carbon 1kohm 1/4W	
R120	241 2405 974	Carbon 1Mohm 1/4W	
R121	241 2398 955	Carbon 1kohm 1/4W	
R201	241 2398 955	Carbon 1kohm 1/4W	
R203	241 2398 955	Carbon 1kohm 1/4W	
R206	241 2398 955	Carbon 1kohm 1/4W	
R301~303	241 2400 092	Carbon 10kohm 1/4W	
R304	241 2398 955	Carbon 1kohm 1/4W	
R401	241 2405 000	Carbon 510kohm 1/4W	
R403	241 2402 951	Carbon 47kohm 1/4W	
R501~504	241 2400 050	Carbon 6.8kohm 1/4W	
R505,506	241 2399 051	Carbon 2.7kohm 1/4W	
R507,508	241 2400 021	Carbon 5.1kohm 1/4W	
R509,510	241 2398 081	Carbon 1.3kohm 1/4W	
R511,512	241 2399 093	Carbon 3.9kohm 1/4W	
R513,514	241 2400 018	Carbon 4.7kohm 1/4W	
R515,516	241 2396 960	Carbon 150ohm 1/4W	
R517,518	241 2403 934	Carbon 100kohm 1/4W	
R521	241 2400 092	Carbon 10kohm 1/4W	
R601~609	241 2397 008	Carbon 220ohm 1/6W	
CAPACITORS GROUP			
C101~103	HMA R810 303	Ceramic 0.1μF/25V	CK14=1E104K AX
C104,105	HMA 5000 402	Ceramic 47pF/25V	CK14=1E470K AX
C106	HMA R810 303	Ceramic 0.1μF/25V	CK14=1E104K AX
C107,108	HMA 5000 409	Ceramic 0.01μF/25V	CK14=1E103K AX
C110	HMA R810 303	Ceramic 0.1μF/25V	CK14=1E104K AX
C114	HMA R810 303	Ceramic 0.1μF/25V	CK14=1E104K AX
C115,116	DA5 0003 214	Ceramic 150pF	CK14NOP-151 AX
C117	254 4254 022	Electrolytic 33μF/16V	CE04W1C330
C118	HMA R810 303	Ceramic 0.1μF/25V	CK14=1E104K AX
C120~123	HMA R810 303	Ceramic 0.1μF/25V	CK14=1E104K AX
C124	255 1264 982	Film 0.0047μF/50V	CF93A1H472J
C125,126	DA5 0003 213	Ceramic 10pF	CK14NOP-100 AX
C127	255 1262 764	Film 1μF/50V	CF93A1H105J
C128	HMA R810 303	Ceramic 0.1μF/25V	CK14=1E104K AX

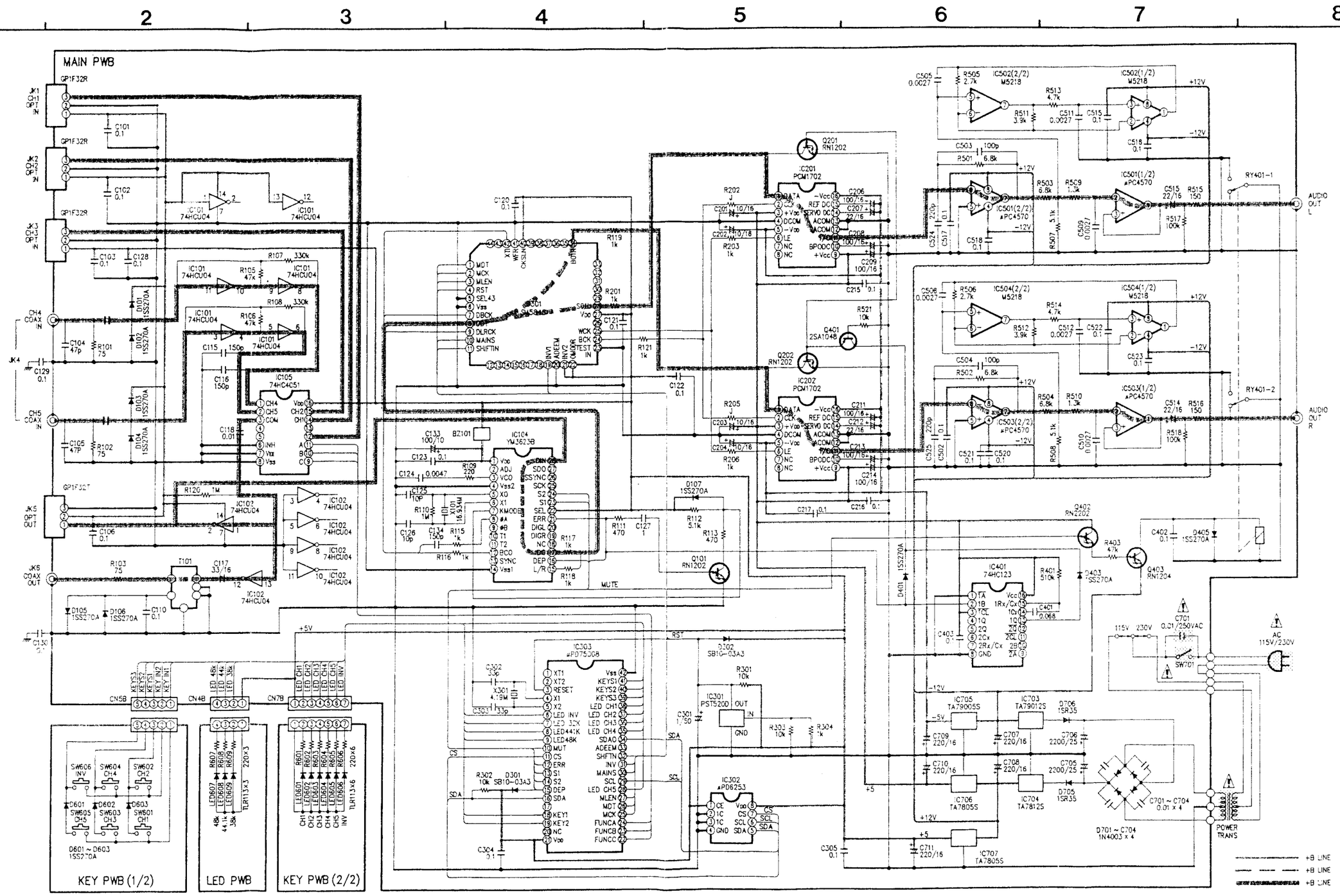
Ref.No.	Part No.	Part Name	Remarks
C129,130	HMA R810 303	Ceramic 0.1μF/25V	CK14=1E104K AX
C134	DA5 0003 212	Ceramic 1000pF/25V	CK14=1E102K AX
C201~204	254 4254 006	Electrolytic 10μF/16V	CE04W1C100
C206	254 4254 941	Electrolytic 100μF/16V	CE04W1C101
C207	254 4254 019	Electrolytic 22μF/16V	CE04W1C220
C208,209	254 4254 941	Electrolytic 100μF/16V	CE04W1C101
C211	254 4254 941	Electrolytic 100μF/16V	CE04W1C101
C212	254 4254 019	Electrolytic 22μF/16V	CE04W1C220
C213,214	254 4254 941	Electrolytic 100μF/16V	CE04W1C101
C215	HMA R810 303	Ceramic 0.1μF/25V	CK14=1E104K AX
C216,217	HMA R810 303	Ceramic 0.1μF/25V	CK14=1E104K AX
C302,303	253 3133 002	Ceramic 33pF/50V	CC45CH1H330J
C304	HMA R810 303	Ceramic 0.1μF/25V	CK14=1E104K AX
C305	HMA R810 303	Ceramic 0.1μF/25V	CK14=1E104K AX
C401	255 1122 024	Film 0.068μF/50V	CF93A1H683J
C402,403	HMA R810 303	Ceramic 0.1μF/25V	CK14=1E104K AX
C501,502	HMA 5000 405	Ceramic 220pF/25V	CK14=1E221K AX
C503,504	HMA 5000 404	Ceramic 100pF/25V	CK14=1E101K AX
C505,506	255 1249 952	Film 0.0027μF/50V	CF93A1H272J
C509,510	255 1249 952	Film 0.0027μF/50V	CF93A1H272J
C511,512	255 1249 952	Film 0.0027μF/50V	CF93A1H272J
C513,414	254 4254 019	Electrolytic 22μF/16V	CE04W1C220
C515~521	HMA R810 303	Ceramic 0.1μF/25V	CK14=1E104K AX
C522,523	HMA R810 303	Ceramic 0.1μF/25V	CK14=1E104K AX
C701(P.SW)	DA5 0003 215	Ceramic 0.01μF	CS17==103Z
C701~704	HMA 5000 409	Ceramic 0.01μF/25V	CK14=1E103K AX
C705,706	254 4256 091	Electrolytic 2200μF/25V	CE04W1E222
C707~711	254 4254 051	Electrolytic 220μF/16V	CE04W1C221
OTHERS PARTS GROUP			
BZ101	235 0049 007	Beads Inductor	
CN4	DA5 003 219	Leed Connector (4P)	
CN4B	205 0233 045	EH Connector Base	
CN5	DA5 003 218	Leed Connector (5P)	
CN5B	205 0233 058	EH Connector Base	
CN7	DA5 003 220	Leed Connector (7P)	
CN7B	205 0233 074	EH Connector Base	
JK1~3	269 0097 007	GP1F32R	
JK4	204 8410 003	2P Pin Jack (BLK/BLK)	
JK5	269 0098 006	GP1F32T	
JK6	204 8495 002	1P Pin Jack (BLK)	
JK7	204 8433 006	2P Pin Jack (WHT/RED)	

Ref.No.	Part No.	Part Name	Remarks
RY401	241 0127 003	Relay	RY-12WK
SW601~606	212 4388 910	Tact Switch	
SW701	DA5 0003 209	Power Switch	
T101	231 8063 009	Pulse Trans	
X101	399 0165 007	Crystal	16.934MHz
X301	399 0082 009	Ceramic resonator	CSA4.19MHZ
	DA5 0003 211	Card Spacer	
	DA5 0003 210	Terminal	for P.T. cable

WIRING DIAGRAM



SCHEMATIC DIAGRAM



WARNING:
Parts marked with this symbol ⚠ have critical characteristics.
Use ONLY replacement parts recommended by the manufacturer.

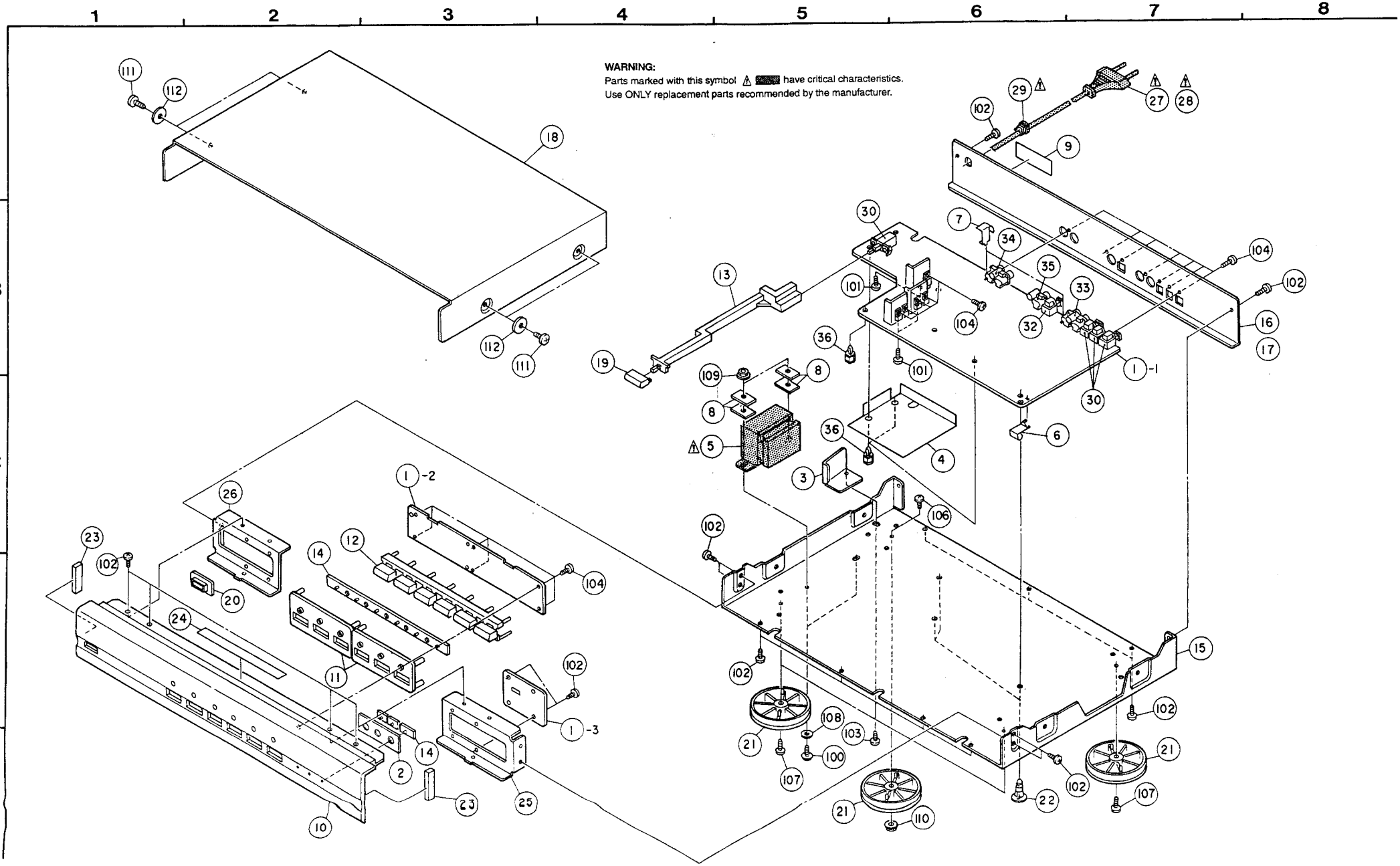
CAUTION:
Before returning the unit to the customer, make sure you make either (1) a leakage current check or (2) a line to chassis resistance check. If the leakage current exceeds 0.5 milliamps, or if the resistance from chassis to either side of the power cord is less than 240 kohms, the unit is defective.

WARNING:
DO NOT return the unit to the customer until the problem is located and corrected.

NOTES:
Circuit and parts are subject to change without prior notice.

NOTES
ALL RESISTANCE VALUES IN OHM. K=1,000 OHM, M=1,000,000 OHM
ALL CAPACITANCE VALUES IN MICRO FARAD. P=MICRO-MICRO FARAD
EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION.
CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

EXPLODED VIEW OF CHASSIS AND CABINET



PARTS LIST OF EXPLODET VIEW

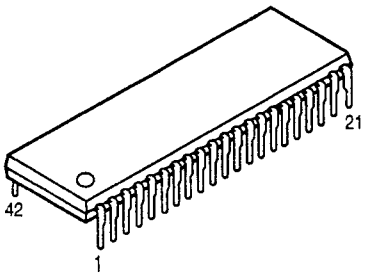
Ref.No.	Part No.	Part Name	Remarks	Q'ty
◉1	DA5 0003 201	Main Unit Ass'y		
1-1	—	Main Unit		
1-2	—	Key Unit		
1-3	—	LED Unit		
◉ 2	DA5 0003 112	Lens sheet		1
3	DA5 0002 113	Biss Guard Bracket	Europe Model	1
4	DA5 0002 114	Insulate Sheet	Europe Model	1
⚠5	HMA R810 121	Power Trans		1
◉ 6	412 2504 105	Earth Plate		1
7	412 3100 003	PWB Earth		2
8	DA5 0003 115	Trans Fix Bracket		4
◉ 10	DA5 0003 100	Front Panel Ass'y		1
◉ 11	DA5 0003 101	Button Base		2
◉ 12	113 1686 101	6P Function Key		1
13	DA5 0003 102	Button Lever		1
◉ 14	DA5 0003 103	Lens		1
◉ 15	411 0752 600	Main Chassis		1
◉ 16	DA5 0003 104	Rear Panel	U.S.A.& Canada Model	1
◉ 17	DA5 0002 104	Rear Panel	Europe Model	1
◉ 18	102 0122 378	Top Cover		1
19	113 1375 207	P.PW. Knob		1
◉ 20	DA5 0003 105	P.PW. Knob Guide		1
◉ 21	104 0208 201	Foot Ass'y		4
22	412 1979 003	PCB Holder		3
23	DA5 0003 106	Sponge		2
24	DA5 0003 107	Himeron		1
25	DA5 0003 108	Side Bracket (R)		1
26	DA5 0003 109	Side Bracket (L)		1
⚠27	HMA 5000 352	AC Cord 2.0mm	U.S.A.& Canada Model	1
⚠28	DA5 0002 110	AC Cord 1.7mm	Europe Model	1
⚠29	HMA 5000 375	Cord Bush		1
30	DA5 0003 209	Power Switch		1
31	269 0097 007	GP1F32R	JK1 ~ 3	3
32	269 0098 006	GP1F32T	JK5	1
33	204 8410 003	2P Pin Jack (BLK/BLK)	JK4	1
34	204 8433 006	2P Pin Jack (WHT/RED)	JK7	1
35	204 8495 002	1P Pin Jack (BLK)	JK6	1
36	DA5 0003 211	Card Spacer		4
SCREW & NUT				
100	DA5 0003 118	Screw 3×10 B		2
101	HMA R810 126	Screw 2.6×8 B		3
102	HMA 5000 330	Screw 3×6 B		15
103	HMA 5000 330	Screw 3×6 B	Europe Model	1
104	DN8 2030 158	Screw 3×8 B		18
106	DA5 0003 119	Screw 3×8 B		1
107	HMA 5000 331	Screw 3×8 B		3
108	475 1140 008	Washer		2

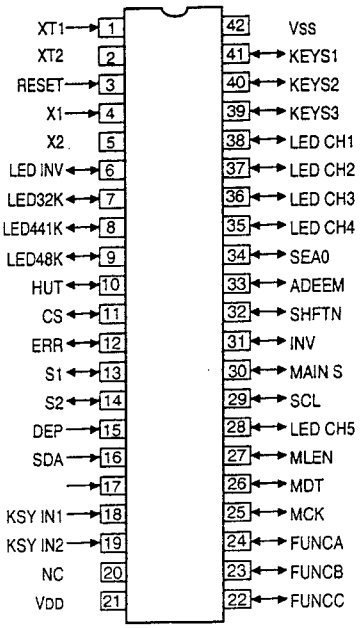
Ref.No.	Part No.	Part Name	Remarks	Q'ty
109	DA5 0003 117	Nut		2
110	DA5 0003 120	Nut		1
111	HMA 5000 336	Screw 4×6 B		4
112	HMA 5000 338	Washer		4
PAKING & ACCESSORIES (not Incided EXPLODED VIEW)				
◉	505 0038 030	Envelope		1
◉	511 2745 009	Operating instruction		1
	HMA 5000 324	2P Pin Cord	1.5mm	1
◉	503 0762 203	Cushion		2
◉	DN8 2030 134	Cabinet Cover		1
◉	501 1873 001	Carton Case		1

SEMICONDUCTORS

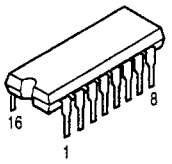
● IC

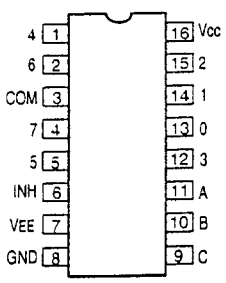
μPD75008



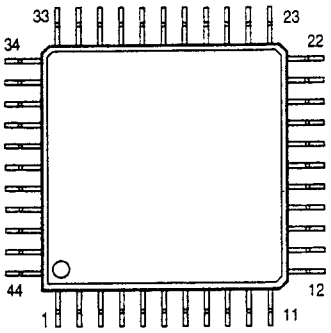


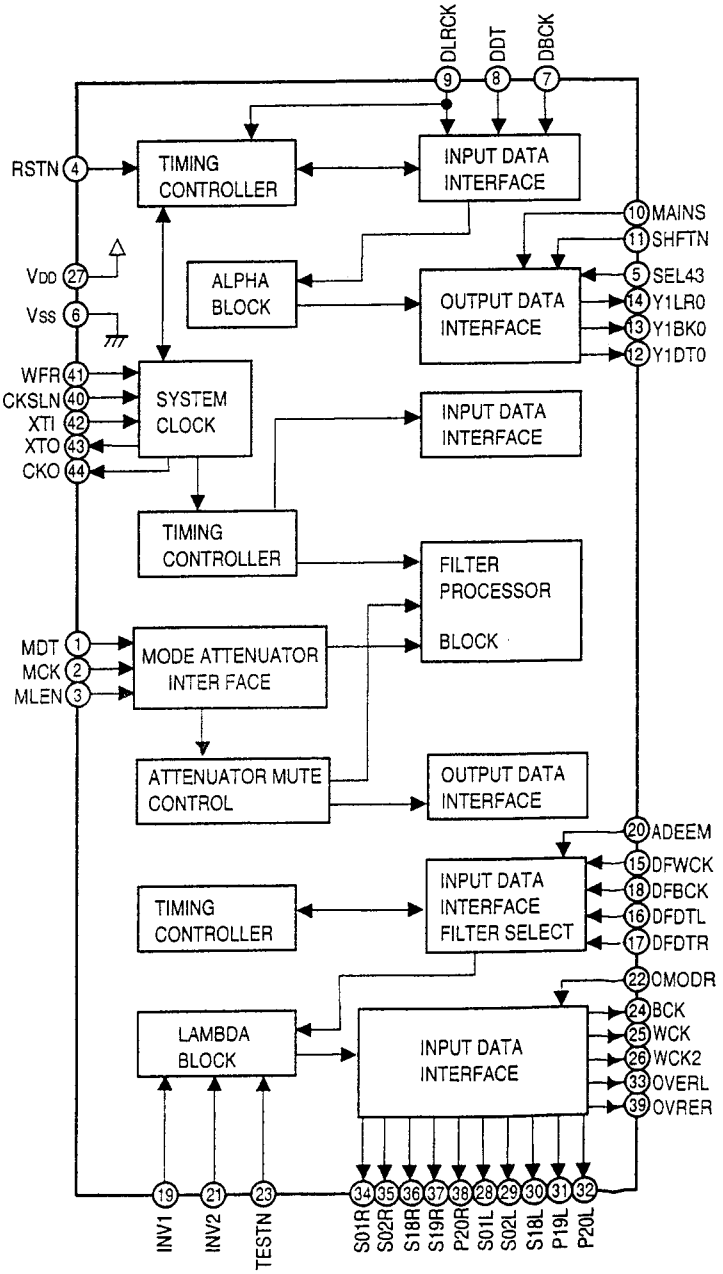
TC74HC4051A



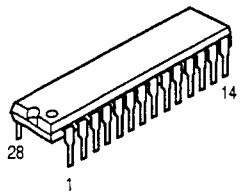


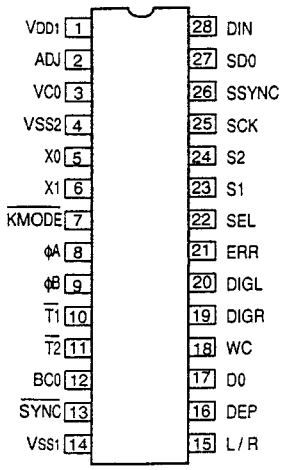
SM5845-AF





YM3623B





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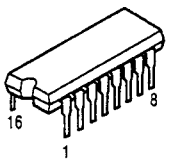

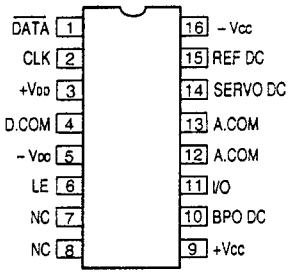

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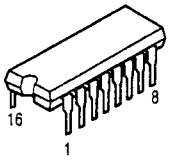

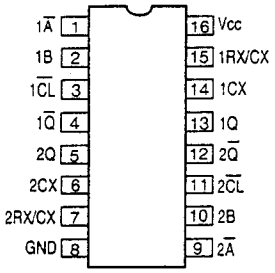

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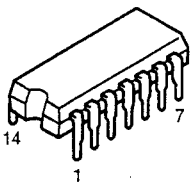

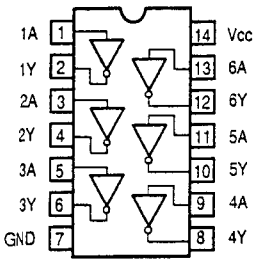

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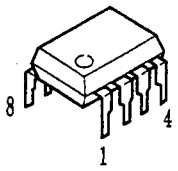

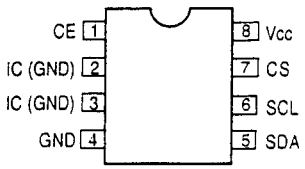

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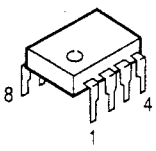

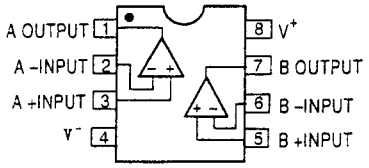

● TRANSISTOR

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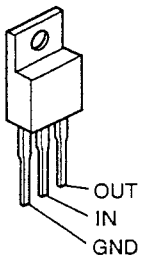

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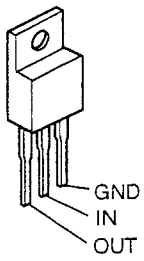
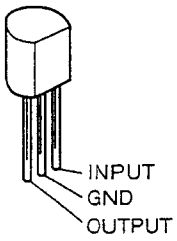
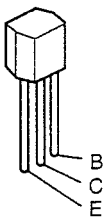


PST520D (RESE IC)



RN1202
RN1204
RN2202



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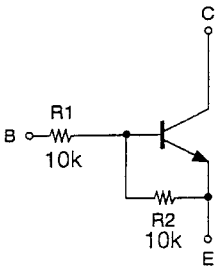

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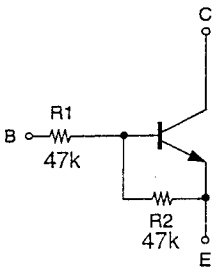

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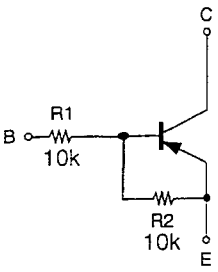

● DIODE

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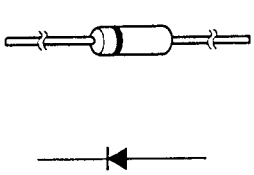
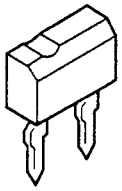


● IC PROTECTOR

ICP-F15



or

ICP-N15